

Phalangeal Osteomyelitis Caused by *Staphylococcus lugdunensis* – A Case Report of a Rare Association and Review of Literature

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Learning Point of the Article:

"Chronic unrelenting bone infections should be thoroughly investigated especially with respect to the virulence of commensal micro-organisms"

Abstract

Introduction: *Staphylococcus lugdunensis* is a skin commensal and its association with bone infections is rare. This case is first of its kind in literature where phalangeal osteomyelitis was caused by *S. lugdunensis*.

Case Report: A 56-year-old man presented with a chronic history of index fingertip pain to the orthopedic clinic. There was a partial resolution of symptoms earlier when commenced on anti-inflammatory and antibiotics in community by the general practitioner. A thorough clinical and radiological evaluation followed by a surgical debridement completely cured his symptoms. *S. lugdunensis* was isolated on culture in this case.

Conclusion: Chronic finger-tip infections can be quite challenging to treat and one should have a high index of suspicion in treating such infections, especially with respect to the virulence of commensal micro-organisms.

Keywords: *Staphylococcus lugdunensis*, finger, osteomyelitis.

Introduction

Osteomyelitis is an inflammation of bone and bone marrow. The most common microorganism causing osteomyelitis is *Staphylococcus aureus*. The cause is often multifactorial ranging from host factors to environmental factors. Often, the infection is florid in an immunocompromised host. The treatment consists of administration of appropriate antibiotics supplemented with surgical intervention in the form of a thorough debridement.

Although *S. aureus* (coagulase positive) is commonly implicated in distal phalangeal osteomyelitis, we report a case of a healthy individual with distal phalangeal osteomyelitis caused by *Staphylococcus lugdunensis* (coagulase negative). In our opinion, this is the first reported case in literature of finger osteomyelitis caused by *S. lugdunensis*.

Case Report

A 56-year-old right-hand dominant gentleman presented to our clinic with a 6-month history of the right index fingertip pain. There was no associated history of any antecedent trauma. This person had earlier visited his general practitioner and was commenced on anti-inflammatory and antibiotic medications. There was partial resolution of his symptoms of pain and swelling. However, resurgence prompted him to approach an orthopedic clinic.

In our clinic, the vital parameters of this patient were normal. On examination of the swelling, he had a non-tender swelling measuring approximately 1 cm × 1 cm on the ulnar aspect of the distal phalanx of the right index finger. There was no overlying redness or features of cellulitis. There was a flexion attitude of approximately 45° at the distal interphalangeal joint. There was no pain on palpation of the middle phalanx. There were no

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Figure 1: Anteroposterior and lateral radiograph of the right index finger demonstrating the destructive lesion in the distal phalanx with a cortical break. The associated ulnar-sided soft tissue swelling is also clearly evident.

palpable epitrochlear or axillary lymph nodes.

Blood investigations showed a mildly elevated value of C-reactive protein at nine. The value of white blood cells and neutrophils was within normal limits.

Radiological investigations showed a well-defined lesion in the distal phalanx with a fracture through the distal phalanx (Fig. 1). There was no periosteal reaction evident.

Under the effect of a local anesthetic (Levobupivacaine + Lidocaine) and finger tourniquet, an incision was placed on the prominent aspect of the ulnar sided swelling over the distal phalanx. There was no pus encountered. A thorough debridement of the distal phalanx was performed (Fig. 2 and 3) and samples were sent for culture and sensitivity. The patient was commenced on oral co-amoxiclav, pending sensitivity results. The finger was splinted for 4 weeks followed by gentle mobilization under the guidance of a hand therapist.

S. lugdunensis was the microorganism identified in the culture and it was sensitive to clindamycin and flucloxacillin. An opinion was sought from the infectious disease consultant and accordingly, appropriate antibiotics were commenced. The

patient had dramatic improvement in his symptoms.

This gentleman was regularly followed up and in 3 months had complete resolution of his symptoms. On his final follow-up at 1 year, he had a completely functional index finger without any stiffness.

Discussion

Fingertip infections may have a varied presentation ranging from a simple felon, suspected bony felon to an established bony felon [1]. A history of trauma is often not present in almost half of the patients. Cellulitis maybe an initial presenting symptom in few cases. Once there is an established abscess formation, then a constant “throbbing” pain is what most patients complain of; this is due to a tight distal soft tissue compartment. Chronic infections often lead to progressive erosion of the bony architecture which may also cause resorption of the distal phalanx altogether in certain cases such as pediatric population [1].

S. lugdunensis was first described by Freney et al., in 1988, using DNA-DNA hybridization technology [2]. It is a coagulase-negative microorganism normally found on the human skin as a commensal. However, it is a rare cause of osteomyelitis [3].

Literature search consists primarily of isolated case reports describing the association of *S. lugdunensis* and osteomyelitis (Table 1). Thomas et al. described a case of a 51-year-old diabetic patient with ear canal osteomyelitis who underwent surgical debridement of the sequestrum. This patient eventually was discharged on oral co-amoxiclav but showed a hearing loss on follow-up [4]. Although in this case diabetes rendered this individual susceptible to an infection, it is noteworthy that our patient had no co-morbidities.

Kear et al. presented a very interesting case of foot osteomyelitis in a 66-year-old diabetic person caused due to *S. lugdunensis*. This case particularly highlights the aggressiveness of this pathogen in causing an erosive bony lesion. The initial X-rays and magnetic resonance imaging (MRI) scans in this case were normal; however, a repeat foot X-ray in 4 days showed cortical lucency in the metatarsal [5]. Ironically, our patient had ongoing symptoms for nearly 6 months before his first



Figure 2: Image intensifier picture showing the curettage procedure of the base of distal phalanx.



Figure 3: Image intensifier picture showing the curettage procedure of the apex of distal phalanx.

Table 1: Bone and Joint infections caused by *Staphylococcus lugdunensis*

Serial No.	Name of Author	Year of publication	Site Involved
1	Murdoch et. al	1996	Spine (Vertebra)
2	Guttman et.al	2000	Spine (discitis)
3	Sampathkumar et. al	2000	Total Knee Arthroplasty
4	Weightman et. al	2000	Prosthetic infection
5	Pérez et. al	2000	Chronic Osteomyelitis
6	Kragsbjerg et. al	2001	Vertebral Osteomyelitis
7	van Henten et. al	2001	Spine (discitis)
8	Greig et. al	2003	Spine (vertebral osteomyelitis)
9	Sanzéni et. al	2003	Total Hip Arthroplasty
10	Cooke et. al	2003	Spine (discitis)
11	Thomas et. al	2006	Auditory (Osteomyelitis)
12	Vigna et. al	2007	Osteomyelitis
13	Mei-Dan et. al	2008	Anterior Cruciate Ligament graft
14	Shah et. al	2010	Prosthetic joint
15	Szabados et. al	2011	Peri-prosthetic infection
16	Arciola et. al	2012	Implant associated osteomyelitis
17	Gahukamble et. al	2014	Intramedullary nail in rabbits
18	Campoccia et. al	2016	Implant infection
19	Kear et. al	2016	Foot
20	Huang et. al	2016	Clavicle
21	Seng et. al	2017	Fracture fixation devices

orthopedic consultation, but his X-rays showed destructive features in the distal phalanx.

In another case of foot osteomyelitis reported by Vigna et al., a healthy 8-year-old child sustained an injury to his foot by stepping on a nail. The time to presentation was 16 weeks (approximately 4 months). The authors have claimed that this case was the first case of osteomyelitis due to *S. lugdunensis* in a healthy individual secondary to a puncture wound[6]. However, our patient had no history of any injury.

The first case of vertebral osteomyelitis was described by Murdoch et al., in an 80-year-old woman with a history of polymyalgia rheumatica[3]. Similarly, another case was described by Greig and Wood in an 81-year-old man with a 5-week history of back pain. This patient was immunocompetent and improved on antibiotics. A follow-up MRI scan showed no worsening in the lumbar spine picture[7].

Weightman et al. have described two cases of infections with *S. lugdunensis*. One was a case of vertebral osteomyelitis in a 78-year-old lady with no preceding surgical history while the other was a prosthetic joint infection in a 72-year-old man, 10 months after undergoing a total knee replacement. Both patients were not immunocompromised and showed improvement on intravenous antibiotics, namely, flucloxacillin [8].

Although our case is the first case of distal phalanx osteomyelitis due to *S. lugdunensis*, we came across a case of subungual abscess in the thumb of a 40-year-old woman. The initial suspicion was *Pseudomonas aeruginosa* and the treatment was

tailored accordingly; however, the culture report was positive for *S. lugdunensis*[9]. This case report highlights the importance of being sceptical about every case and to avoid any assumptions about the causative organism.

Radiological investigations such as X-ray and MRI definitely have a role in diagnosing infection due to *S. lugdunensis*; however, there have been instances when initial investigations were normal [5]. Huang et al. have reported the role of fluorodeoxyglucose positron emission tomography with computed tomography in localizing clavicular osteomyelitis as an invaluable adjunct to an MRI scan [10].

S. lugdunensis has shown a susceptibility to β -lactam group of antibiotics in all the cases described earlier and generally resistance is low[11,12]. However, antimicrobial resistance has been reported by Kragsbjerg et al. to β -lactam antibiotics and other groups. Modifications in cell wall composition and changes in penicillin-protein-binding affinity have been implicated in resistance to the β -lactam group, whereas chromosomal mutation resulting in RNA polymerase and DNA gyrase or topoisomerase activity is related to other antibiotics, namely, rifampicin and ciprofloxacin[13].

Our patient responded well to the surgical debridement and antibiotic therapy based on the culture and sensitivity reports. We strongly feel that the absence of any comorbidity favored the early and uneventful recovery in this particular case.

Conclusion

S. lugdunensis although is identified as a part of normal skin flora, one should not underestimate the virulence of this pathogen. The consequence of assumptions made on the basis of historical association of microorganisms such as *Staphylococcus epidermidis* with prosthetic infections and *S. aureus* with fingertip infections can be potentially life threatening. Not only is valuable time lost in identifying this pathogen but also the delay in diagnosis and inappropriate administration of antibiotics can lead to emergence of a resistant strain,. Our recommendation is that as a treating physician one should be extremely cautious and have an open mind in treating infections due to *S. lugdunensis*.

Clinical Message

Chronic unrelenting infections should be evaluated thoroughly, especially in cases when the patient is still symptomatic and represents. One should have an open mind and high index of suspicion in treating such cases.

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